

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Christopher Wolfe on 3/23/2010.

The application has been amended as follows:

CLAIMS

Claims 16 and 20 have been canceled.

1. (currently amended): A catalytic decomposition propulsion system, the system comprising,

a propellant tank for storing a propellant, the propellant comprising hydroxyl ammonium nitrate, and

a decomposition chamber for supporting a catalyst for reacting with the propellant for decomposing the propellant into a gas, and

a control valve positioned between the propellant tank and the decomposition chamber for controlling the passage of the propellant to the decomposition chamber, wherein:

the control valve has an opened state and a closed state,

the control valve passes a first amount of propellant in the opened state during a first time period and passes substantially no propellant in the closed state during a second time period,

the control valve is configured to repeatedly transition between the opened state and the closed state such that a majority of the first amount of the propellant passed through the control valve during the first time period decomposes during the second time period.

17. (previously presented): A catalytic decomposition propulsion system, the system comprising,

a propellant tank for storing a propellant, the propellant comprising hydroxyl ammonium nitrate,

a decomposition chamber for supporting a catalyst for reacting with the propellant for decomposing the propellant into a gas,

a control valve positioned between the propellant tank and the decomposition chamber for controlling the passage of the propellant to the decomposition chamber, the control valve operating in a opened state and a closed state, the control valve passing a first amount of propellant in the opened state during a first time period and passing substantially no propellant in the closed state during a second time period, and

an injector manifold disposed between the decomposition chamber and the flow control valve, the injector manifold having a plurality of injector orifices for distributing the propellant into the decomposition chamber, and

a nozzle for exhausting the gas from the decomposition chamber, the nozzle having convergent portion, divergent portion and a throat portion, wherein:

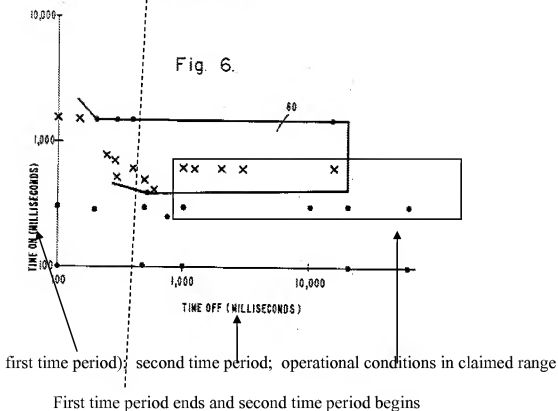
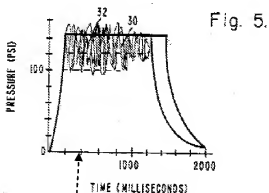
the valve is continuously operated between the opened and closed states such that a majority of the first amount of the propellant passed through the control valve during the first time period decomposes during the second time period; and

a current rate of decomposition of propellant in the decomposition chamber increases after the control valve changes from the opened state to the closed state.

REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance: the prior art of record do not teach the specific propellant in combination with the rest of the claim limitations. In particular, as described in the specification the hydroxyl ammonium nitrate propellant is significantly different than the hydrazine propellant used in the Ellion references with a slow decomposition rate and long ignition delay time (see pages 6, 7 of the specification). Hence, one cannot simply use the hydroxyl ammonium nitrate propellant in a hydrazine propulsion system of the prior art. However, applicant argues

in the amendment of 01/14/2010 that the Ellion '972 does not have the requisite timing for e.g. "the valve is continuously operated between the opened and closed states such that a majority of the first amount of the propellant passed through the control valve during the first time period decomposes during the second time period." On the contrary, Ellion '972 teaches in Fig. 6, the time of the valve is on (the first period) vs. the time they are off (the second period) for the propellant. The solid circles indicate operable times with smooth pulses (see col. 2, lines 50+) and the X have the rough firing. The time that the valve pulse occurs (the first time period) for the solid circles should be about 300-400 milliseconds, considering the y-axis is a logarithmic scale. The pressure pulses of Fig. 5 show the pressure resulting from the decomposition process vs. the total time. Clearly 300-400 milliseconds for the first time period is a short time period. After that first time period, the valve pulse is closed (note that the valve can be closed for much more than 10,000 ms in Fig. 6) and the fuel continues to decompose with the vast majority occurring during the second time period, i.e. the time immediately after the first time period, when the valve is closed. Some exemplary conditions below with the smooth operation (solid circles) clearly will be in the claimed ranges and are highlighted below by the Examiner. Furthermore, many conditions in region 60 will also meet the claimed limitations, they will merely have rough firing 32. Regardless of whether the firing is rough or smooth is immaterial to the claims but rather only the amount of decomposition that occurs in each time period.



Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cuff, can be reached at 571-272-6778. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>

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